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MONTANA FISH AND GAME DEPARTMENT  
FISHERIES DIVISION

JOB COMPLETION REPORT

RESEARCH PROJECT SEGMENT

State of Montana

Project No. F-12-R-10

Name Western Montana Fisheries Study

Job No. I

Title Inventory of Waters of the Project Area

Period Covered: July 1, 1963 through June 30, 1964

ABSTRACT:

Twenty-three lakes and seven streams were surveyed during the report period.

Twenty-one of the lakes were mountain lakes surveyed using a helicopter as the equipment and personnel carrier. Two lakes were follow-up surveys.

An opening day creel census was made on Browns Lake and Georgetown Lake.

Five streams were checked by electrofishing. Three of these were to evaluate stream improvement structures, one to secure information prior to mine dredging, and one to obtain background information for the Rock Creek Creel Census.

One lake and four streams in the Bitterroot drainage were sampled to collect fish for analysis of residues of DDT and its metabolites.

OBJECTIVES:

The primary objective of the job is to obtain basic information through general surveys on waters for which no fish population, physical or chemical data are available.

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A secondary objective is to conduct follow-up surveys on waters where additional information is needed to evaluate management practices.

#### TECHNIQUES USED:

The lake and stream surveys were done by standard survey methods as used in previous years. A helicopter was used for the mountain lake surveys.

The following is a list of common names, abbreviations used, and scientific names used for all species mentioned in this report.

Scientific and common names are those listed in the American Fisheries Society Special Publication #2, 1960.

Common Name	Abbreviation	Scientific Name
Kokanee	KOK	<u>Oncorhynchus nerka</u> (Walbaum)
Mountain whitefish	Wf	<u>Prosopium williamsoni</u> (Girard)
Cutthroat trout	Ct	<u>Salmo clarki</u> Richardson
Rainbow trout	Rb	<u>Salmo gairdneri</u> Richardson
Brown trout	LL	<u>Salmo trutta</u> Linnaeus
Brook trout	Eb	<u>Salvelinus fontinalis</u> Mitchill
Dolly Varden	Dv	<u>Salvelinus malma</u> (Walbaum)
Longnose sucker	F Su	<u>Catostomus catostomus</u> (Forster)
Common sucker	C Su	<u>Catostomus commersoni</u>
Largescale sucker	C Su Col	<u>Catostomus macrocheilus</u> Girard
Sculpin	Cott	<u>Cottus</u> spp.
Northern squawfish	SQ	<u>Ptychocheilus oregonensis</u> (Richardson)
Peamouth	CRC	<u>Mylocheilus caurinus</u> (Richardson)
Yellow perch	YP	<u>Perca flavescens</u> (Mitchill)
Largemouth bass	LMB	<u>Micropterus salmoides</u> (Lacepede)
Pumpkinseed	PS	<u>Lepomis gibbosus</u> (Linnaeus)

#### FINDINGS:

##### Mountain Lakes

The data obtained in mountain lake survey is summarized in Table I.

From these data management recommendations have been made.

Table I. SUMMARY OF MOUNTAIN LAKE SURVEY DATA, UPPER CLARK FORK,  
JULY AND AUGUST 1963

Lake	Location (County)	Area Acres (Est.)	Max. Depth	Number of Net Sets	Species	Number Caught	Ave. length inches	Ave. weight pounds
Carter	Missoula	6	43'	1		none	--	--
Big	"	20	121'	1	Rb	24	10.0	0.39
Pothole #5	"	<1	--	Too small and shallow				
" 7	"	<3	6'	Too small and shallow				
" 12	"	<1	--	Too small and shallow				
" 13	"	<1	--	Too small and shallow				
" 14	"	<1	4'	Too small and shallow				
" 16	"	<1	--	Too small and shallow				
" 18	"	<1	--	Too small and shallow				
" 19	"	<1	--	Too small and shallow				
" 20	"	<1	--	Too small and shallow				
" 34	"	1	--	Too small and shallow				
Unnamed #10	"	8	82'	1	Rb	4	13.6	0.91
" 11	"	8	88'	1	No fish taken			
" 15	"	4	20'	1	No fish taken			
Lower Twin	"	4	29'	1	No fish taken			
Upper Twin	"	4	--	Too small and shallow				
McKinley	"	10	30'	1	Rb	10	10.5	0.39
Roosevelt	"	3	--	Too small and shallow				
Sheridan	"	7	34'	1	Rb	28	9.3	0.30
Worden	"	8	35'	1	Rb	15	9.4	0.34

#### Salmon Lake

Summaries of the gill net catches from 1956 through 1963 are shown in  
Table II.

Table II. NUMBER OF FISH TAKEN IN NINETEEN GILL NETS FROM SALMON LAKE IN  
1957, 1961, 1962 and 1963

Year	KOK	Wf	Ct	Rb	LL	Dv	F	Su	C	Su	Col	SQ	CRC	YP	PS	Percent Game Fish*
1956	2	81	4	1	2	3	96			86		164	71	760	15	7.3
1961	44	112	1	2	6	15	62			83		178	177	242	10	19.8
1962	126	123	1	1	6	16	83			145		163	98	113	9	32.7
1963	134	112	1	2	7	13	68			125		160	77	146	14	25.9

\*KOK, Wf, Ct, Rb, LL, Dv

Nineteen overnight gill net sets were made in Salmon Lake during the week of October 14-18, 1963. In the four years of netting since 1956 the percentage of game fish have increased in the catch. The principal changes have been the increase in kokanee and the decrease in yellow perch. All other species caught in the nettings have remained quite consistent (Table II). It may be concluded that the stocking of 56,000 3" rainbow trout in 1961 has not been reflected in any increase in the gill net catch rate.

#### Bowman Lake

Five, overnight, standard experimental gill net sets were made in Middle Bowman Lake. This is the fourth year of sampling on the lake and the second year since an irrigation-water storage dam was completed at the outlet. The catch by species, fish per net, and average total length by species are shown for the four years in Table III. The average lengths at annulus are shown in Table IV.

Table III. TOTAL CATCH, CATCH RATE, AND TOTAL LENGTH BY SPECIES FROM GILL NETS SET IN MIDDLE BOWMAN LAKE

Species	Total Catch				Total fish per net night			
	1960	1961	1962	1963	1960	1961	1962	1963
Ct	93 (9.2)*	26 (10.0)	61 (10.6)	44 (11.7)	11.0	7.4	12.6	10.6
Rb	17 (10.1)	11 (10.2)	2 (10.6)	9 (13.2)				

\*Figures in parentheses are average total lengths in inches

Table IV. GROWTH RATES OF CUTTHROAT TROUT, BOWMAN LAKE 1960-1963

	Average length at annulus in inches				
	I	II	III	IV	V
1960	2.7	6.2	8.3	10.8	
1961	2.8	6.1	8.9	--	
1962	3.0	6.6	10.0	11.6	
1963	3.3	6.5	9.4	12.5	13.2

The average size of both the cutthroat and rainbow trout has increased steadily since 1960. The rate of growth (as judged by length at various annuli) is about the same as found in 1962. It is recommended that the study continue another year to see if the growth rates have stabilized.

#### Stream Surveys

##### Rock Creek

Fifteen 300-foot sections in Rock Creek were electrofished in 1960 and in 1963 to compare species composition in a year of stocking with a year of no stocking and when hatchery fish were at a very low level.

In 1963, with higher water and a less powerful generator than in 1960 the total catch of fish over the same stations was reduced from 1507 in 1960 to 822 in 1963 (Table V). Despite the reduction in the total catch the percentage composition was similar for the two years.

Table V. TOTAL NUMBER OF FISH TAKEN BY ELECTROFISHING IN ROCK CREEK

Year	Rb Stocked	Rb Wild	LL	Ct	Eb	Dv	Wf
1960	68*	179	19	29	18	23	1171
1963	3	122	11	15	8	15	648

\*Included one 1959 hatchery rainbow. All others are 1960 stocking.

In 1960 hatchery rainbows represented 4.5 percent of the total fish taken and wild rainbows 11.9 percent, or combined they represent 16.4 percent of all fish taken (Table VI).

Table VI. PERCENTAGE COMPOSITION OF ELECTROFISHING CATCH IN ROCK CREEK

Year	Rb Stocked	Rb Wild	LL	Ct	Eb	Dv	Wf
1960	4.5	11.9	1.26	1.92	1.19	1.53	77.70
1963	0.36	14.8	1.34	1.83	0.97	1.83	78.83

A comparison of the average total length for the two years is shown in Table VII.

Table VII. AVERAGE TOTAL LENGTH OF FISH TAKEN BY ELECTROFISHING IN ROCK CREEK

Year	Rb Stocked	Rb Wild	LL	Ct	Eb	Dv	Wf
1960	9.7	7.5	11.9	7.1	6.7	11.0	9.6
1963	10.8	7.7	10.7	7.2	7.0	10.0	9.6

#### Twelve Mile Creek

Since 1961, the St. Regis District of the Coeur d'Alene National Forest has installed 59 stream-improvement structures on Twelve Mile Creek. Most of these are either rock or log check dams which tend to create a pond above and a hole below.

Five sections of the stream were electrofished, three were in the areas with structures and two were not. One of the unimproved sections contained poorer than normal habitat and the other was fairly typical of the normal fish habitat. Table VIII shows the catch and average length of fish taken in the "improved" and "unimproved" sections. The difference in the catch of fish in the improved and unimproved sections is probably significant only for cutthroat trout.

Table VIII. CATCH OF TROUT IN IMPROVED AND UNIMPROVED SECTIONS OF TWELVE MILE CREEK

	Cutthroat		Dolly Varden		Brook	
	Imp.	Unimp.	Imp.	Unimp.	Imp.	Unimp.
Ave.No. of fish per section	45	25	5	7	16	14
Ave.total length of fish over 6"	7.3	7.3	8.0	7.5	6.8	7.2
Ave.total length of fish under 6"	4.5	4.2	5.9	4.2	4.4	4.3

These areas should be revisited to check on permanence of structures and long termed effects on the fish population.

### Nez Perce

Four 300-foot sections of Nez Perce Fork of the Bitterroot River were electrofished in cooperation with the U.S. Forest Service in an effort to evaluate the effectiveness of gabions on fish habitat. Section 1 in poor habitat and Section 4 in good habitat are without gabions. Sections 2 and 3 have gabions.

The gabions were placed in the center of the stream to act as boulders, but were so large that most of them were creating bars rather than holes.

The efficacy of these types of gabions cannot be demonstrated by the data gathered by the electrofishing. Table IX shows the catch and average size of fish taken in each section.

Table IX. CATCH AND SIZE OF FISH TAKEN BY ELECTROFISHING FOUR SECTIONS OF THE NEZ PERCE FORK OF THE BITTERROOT RIVER

Section	Ct	Dv	Eb	Wf
With Gabions				
2	14 (5.8)*	4 (7.3)	1 (5.7)	3 (8.4)
3	28 (5.6)	3 (5.8)	6 (6.8)	1 (8.1)
Without Gabions				
1	10 (5.6)	1 (4.5)	0	4 (8.9)
4	45 (4.6)	3 (6.4)	19 (5.4)	4 (5.3)

\*Numbers in parentheses are average total lengths in inches

### Big Creek

Four sections of Big Creek were electrofished to obtain data before the start of a dredge mining operation. Three sections were below the site of proposed operations and one site was above.

The catch of fish in the various sections is shown in Table X.

Table X. CATCH OF FISH TAKEN BY ELECTROFISHING FOUR SECTIONS OF  
BIG CREEK

Section	Ct	Rb	Eb	Wf	Cot
Below proposed dredging					
1	8	--	10	--	437
2	26	1	31	1	337
3	25	--	39	14	350
Above proposed dredging					
4	27	--	9	--	49

#### Flint Creek

A 350-foot section of Flint Creek which was straightened in 1956 was again electrofished to compare with data obtained prior to the channel change.

Twenty-one fish over six inches in length were taken from this straightened section--an average for the past four years was 23. Prior to straightening this section of stream supported from 55 to 75 trout over six inches in length.

#### Opening Day Creel Census

##### Browns Lake

The fishing pressure and success on the opening day was estimated by contacting anglers at the completion of their trips and making boat and shore angler counts at 3-hour intervals. During the day 166 boat anglers and 34 shore anglers were contacted. It was estimated 1500 anglers fished 6660 hours and caught 2194 fish. The average catch rate was 0.33 fish per man hour.

##### Georgetown Lake

Georgetown Lake was still ice covered on opening day and fishing was restricted to open areas along the shore. The 36 anglers contacted caught 30 fish. This represents a catch rate of 0.82 fish per hour.



#### DDT Residues in Fish

Fish were collected from nine places in the Bitterroot River, two places in Skalkaho drainage, one place in Brewster Creek and from Lake Como and samples of eggs and fat from these fish were taken for analysis of DDT and its metabolites. Results of these analyses are shown in Table XI.

Collections and analyses will continue throughout the remainder of the summer.

#### Location of Data

Original survey data are filed at the district office and copies of the lake and stream survey cards have been filed at district headquarters and the main office in Helena.

Table XI. DDT RESIDUES FOUND IN FISH EGGS AND FAT

Species	Tissue*	Date	Location	% Fat	PPM			
					DDT	DDE	DDD	Total
R.B.	Eggs	3-22-64	Bitterroot R. S. Darby	5.8	.07	2.1	.03	2.2
R.B.	Fat	5-12-64	Skalkaho Cr. (Fullerton Gulch)	52.8	2.2	7.9	.89	10.99
R.B.	Eggs	5-12-64	Skalkaho Cr. (Fullerton Gulch)	4.8	.07	.60	.01	.67
Squawfish	Fat	6-1-64	Bitterroot R. Bell Crossing	59.4	.70	1.7	.30	2.7
Squawfish	Eggs	6-1-64	Bitterroot R. Bell Crossing	.17	.04	.02	.04	.1
R.B. (13")	Fat	6-3-64	Bitterroot R. Charlos Heights	38.7	<.01	2.1	<.01	2.1
R.B. (13")	Eggs	6-3-64	Bitterroot R. Charlos Heights	5.4	<.01	1.5	<.01	1.5
R.B. (12")	Fat	6-3-64	Bitterroot R. Charlos Heights	21.1	.07	.12	<.01	.19
R.B. (12")	Eggs	6-3-64	Bitterroot R. Charlos Heights	7.6	.05	3.8	<.01	3.85
C.T.	Eggs	5-27-64	Brewster Cr.	4.3	.33	1.1	.08	1.51
C.T. (9")	Eggs	6-13-64	Daly Cr. Skalkaho	5.6	.40	1.1	.09	1.59
R.B.(10-12")	Eggs	6-18-64	Como Lake	3.5	.10	1.5	<.01	1.60
Brown	Fat	6-21-64	Bitterroot R. S.Stevensville	40.1	.27	.67	.04	.98
R.B.	Fat	6-21-64	Bitterroot R. S.Stevensville	71.6	.39	.51	.02	.92
Brown	Eggs	6-21-64	Bitterroot R. S.Stevensville	5.8	.02	.04	.02	.08
R.B.(2 lbs.)	Eggs	6-22-64	Bitterroot R. Hamilton	11.8	.29	.72	.13	1.14

\*Fat was taken from the intestine

Prepared by Boyd R. Opheim & Keith G. SeaburgDate March 31, 1965

Approved

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